

photographically by means of a beam of light reflected from a mirror attached to the magnet. With rise of temperature the magnetic moment diminishes slightly, whilst the rigidity of the quartz increases, both causes tending to diminish the angle of torsion and so simulating a fall in  $H$ . Measurements made on one of the magnetographs prior to its despatch from England showed a temperature coefficient of approximately  $6\gamma$  for  $1^\circ$  C. ( $1\gamma \equiv 1 \times 10^{-5}$  C.G.S.); but the values obtained in India with different magnet systems and suspensions are mostly about  $12.5\gamma$  for  $1^\circ$  C. There is, however (see footnote p. 13), no necessary contradiction between these results. The untwisting caused by a given rise of temperature varies as the total angle of torsion, and this varies as the local value of  $H$ . But  $H$  in India is nearly twice as large as in England. Thus the movement of the magnet due to the change of rigidity in the fibre caused by a rise of  $1^\circ$  is nearly twice as big in India as in England. The memoir discusses the temperature experiments made in India, and the difficulties arising from imperfect temperature control, defects in quartz fibres or in the method of fixing them, and from other causes. The observational data are recorded, and exhibited in the curves, with a detail which is unusual in a printed volume. The values found for the temperature coefficients in India are five times larger than those applicable in England to some magnetographs of older types with metal suspensions. Even in magnetic chambers under refined temperature control, a small temperature coefficient has advantages which can be fully appreciated only by those experienced in the reduction of magnetic data. Thus the results of the present memoir, though of limited general interest, deserve the attention of instrument makers.

#### NOTES.

WE regret to see the announcement that Prof. C. J. Joly, F.R.S., Royal Astronomer of Ireland, died on January 4 after a long illness. He was only forty-one years of age.

A BILL which provides for the adoption of the weights and measures of the metric system in all departments of the Government of the United States on July 1, 1908, has been introduced into Congress.

A CENTRAL NEWS message from New York states that by the will of the late Mr. Yerkes the Yerkes Observatory, Chicago, is given the sum of 20,000.

ARRANGEMENTS are being made for the celebration of the twenty-first anniversary of the foundation of the Royal Geographical Society of Australia, Queensland. It is proposed at the end of the current session, in the last week of June, to carry out some appropriate form of commemorative ceremonial to mark the close of the first twenty-one years of activity of the society.

ON Tuesday next, January 16, Prof. E. H. Parker will deliver the first of a course of three lectures at the Royal Institution on impressions of travel in China and the Far East. The Friday evening discourse on January 19 will be delivered by Prof. J. J. Thomson, the subject being some applications of the theory of electric discharge to spectroscopy. On February 2 the discourse will be delivered by Prof. S. P. Thompson on the electric production of nitrates from the atmosphere.

As the signature "H. Weir" occurs so frequently to the illustrations of "Wood's Natural History," which was the popular zoological work of a generation ago, a refer-

ence to the death of Mr. Harrison Weir, the well known animal artist, claims a place in our columns. Mr. Weir, who was born at Lewes in 1824, died at his residence at Appledore, Kent, on January 3, at the close of a long period of retirement. Although his portraits of wild animals can scarcely be compared with those of Wolf, they are in most cases—except when drawn from menagerie specimens in poor condition—true to nature and display considerable spirit. Mr. Weir's special *forte* was, however, the portraiture of domesticated poultry, and his work "Our Poultry" has a permanent value as an authentic record of the characteristics of the different breeds at the time it was written. As a judge of poultry and pigeons the deceased artist had a high reputation.

THE first expedition sent out to West Africa by the Liverpool Institute of Commercial Research in the Tropics left England on January 6. The members, who are conducted by Lord Mountmorres, director of the institute, are:—Mr. Kenneth Fisher, chemist; Mr. L. Farmer, botanist; Dr. Slater Jackson, entomologist; and Mr. Coates, commercial adviser. The expedition is proceeding to Dakar, Bathurst, Konakri, and, if possible, to the Cameroons. Being only an experimental expedition, the stay on the west coast will not be of very long duration; in fact, Lord Mountmorres is to return in time to visit the exhibition of rubber at Ceylon in April. But should the results prove satisfactory there is every probability that the institute will dispatch a second expedition to spend a long period in Africa. One of the chief objects of the expedition will be an inquiry into the cultivation of rubber—how to improve the quality of West African rubber in order to bring it up to the same standard as the similar rubber from other colonies, and how to protect and increase the present supply. An effort will also be made to discover new sources of oils, and to find means of increasing the supply by making use of present waste. As regards the study of the prospects of West Africa becoming a fibre-producing country, this branch of the work will include investigation regarding the establishment of hemp, cotton, jute, and ramie growing, and also of new fibres.

WE have received a copy of the report of the Albany Museum for 1904, in which substantial progress is recorded on all sides. It is satisfactory to learn that the proposed cooperation between the museum and the Rhodes University College promises to be of advantage to both institutions. Dr. Schönland, the director of the museum, has already been appointed professor of botany in the college.

MUCH interest attaches to a paper by Mr. Pilgrim in part iii. of the *Records of the Geological Survey of India* for 1905, in which the author describes an elephant skull from the alluvium of the Godavari valley. This skull belongs to *Elephas namadicus*, of Falconer and Cautley, but the author brings forward evidence which in his opinion proves the identity of that form with the European *E. antiquus*.

OUR knowledge of the land and fresh-water molluscs of Formosa and Japan has been greatly extended by the work of Japanese collectors, the results of which are described by Messrs. Pilsbry and Hirase in the October, 1905, issue of the *Proceedings of the Philadelphia Academy of Sciences*. The collections from Formosa were made in Taiwan, and chiefly consist of land-shells; but although no labour or expense were spared, the number of specimens procured was not so large as anticipated. Nevertheless, out of a total of seventy-one species, twenty-

seven, together with thirteen new subspecies, are described as new. The Japanese collection was chiefly made in the Kyushu and Ryukyu chains of islands, and is most satisfactory, as we have now a fair knowledge of the snails of all the larger and of many of the smaller islands.

THE muscles of the jaws and pharynx in dog-fishes and skates form the subject of an illustrated article by Mr. G. E. Marion in the December, 1905, number of the *American Naturalist*. Considering the marked difference in the shape of the two species, the similarity in their muscular system is noteworthy; but, as might have been expected, the skate possesses a few muscles not found in the dog-fish. The deep muscles of the trunk of the former are described for the first time. In another paper Dr. E. N. Transeau discusses the forest-centres of eastern North America, and arrives at the conclusion that there are four such developmental areas, namely, the great conifer forest of the north-east, the deciduous forest of the Ohio basin, the south-eastern coniferous tract, and the insular tropical forest of southern Florida, the centre of which is in the West Indies. The forest-centres correspond with centres of high temperature and humidity.

SOME practical results may perhaps follow a paper contributed by Mr. E. Iwanoff to *Biologisches Centralblatt* of December 15, 1905, on the cause of sterility in zebra-pony hybrids. Sterility appears to attach to the male and not to the female hybrids, although the latter really produce this sterility. For it appears, according to the author's researches, that the spermatozoa are destroyed by leucocytes while within the body-cavity of the female. The female-blood is, in fact, found to contain a substance known as spermatotoxin, which acts fatally on the spermatozoa. A similar substance also exists in the blood of female hybrid trout, but as impregnation of the ova takes place outside the body-cavity, no ill results follow to the spermatozoa. It is suggested that in the case of female zebra-hybrids the effects of the spermatotoxin should be neutralised by the injection of an anti-spermatotoxin serum.

IN the *Biologisches Centralblatt* (December 15, 1905) Prof. Gorjanovié-Kramberger discusses the relationships of the race of men whose remains have recently been discovered at Krapina, south of the Styrian frontier. From the examination of these remains it appears that the Krapina race is identical with the one from Neanderthal, Spy, La Naulette, Schipka, &c., for which the name *Homo primigenius* has been proposed. From this primitive type there seems to be a complete transition in cranial characters, through the upper diluvial *H. sapiens fossilis*, to modern man, who occasionally exhibits some of the peculiarities of the ancestral form, such as the absence of the chin prominence and the presence of wrinkles in the enamel of the molars. The pre-diluvial race of Galley (?) Gallows Hill, England, presents a difficulty, since, although this is the oldest, it is at the same time the most modern type. This is explained by the theory of the existence at this early date of two distinct types of mankind, namely, *Homo sapiens fossilis* at Galley (?) Hill, which had attained a relatively high development, and *H. primigenius* at Krapina, Neanderthal, &c., the advance of which may have been prevented by unfavourable conditions of existence.

THE contents of No. 195 of the *Quarterly Journal of Microscopical Science* relate to the anatomy, histology, development, &c., of various groups of invertebrates, and are all of a highly technical nature. Prof. Haswell contributes the first part of a series of papers on the turbel-

larian worms, dealing in this instance with *Heterochærus*; while Prof. Carpenter discusses the segmentation and phylogeny of arthropods, and Mr. Hill records his observations on the maturation of the ovum of *Alcyonium*. Mr. F. C. Sinclair, in the fourth article, alludes to certain points in the anatomy of the myriopods of the family *Platydesmidæ*; and in the fifth and last Prof. Minchin describes a new sporozoan infesting the mucous membrane of the human nasal septum. At the end of his paper Prof. Carpenter observes that "the more probable conclusion seems to be not that arthropods and polychæte annelids stand to each other in the relation of descendants to ancestors, but that the two groups represent specialised collateral branches from a common stock. My own view is that their common ancestors were microscopic animals, unsegmented, or with comparatively few segments between a broad head-lobe and a narrow tail-somite. The occurrence of the nauplius larva in some members of all the great crustacean groups justifies the phylogenetic importance attached to that form by Müller."

THE position and relations of the abdominal and thoracic viscera of an adult male negro are described and very fully illustrated in a monograph entitled "Topography of the Thorax and Abdomen," by Prof. Potter, just published by the University of Missouri (University of Missouri Studies, Science Series, vol. i., No. 1). The monograph represents a contribution to "descriptive anatomy"—the raw material out of which, when enough has been accumulated, we may hope to build a "scientific anatomy." For several reasons this contribution, though small, is valuable, first, because of the accuracy of the workmanship; secondly, because it deals with a well developed adult man, accidentally suffocated; and thirdly, because it deals with the Negro race, the anatomy of which at the present moment is of the greatest interest. This interest centres round, not what may be called the normal anatomy of that race, but its variations and abnormalities, and to obtain a knowledge of these, records of hundreds of subjects are required. In the subject described by Prof. Potter the cæcum occupies an abnormally high position, a position recalling that seen in the young European child and in the Anthropoid; this, apparently, is a characteristic of the Negro race, for in four subjects recently dissected by the writer of this note a similar condition was observed. Prof. Potter built up the reconstructions and projections shown in the plates of his monograph from a series of twenty-five sections, into which the trunk was divided after being hardened by the injection of a 50 per cent. solution of formaldehyde—a solution employed first by Prof. Jackson. Prof. Potter is to be congratulated on the manner in which he has carried out a laborious task.

SOME figures quoted by the Governor of the Bahamas in his report on the Blue-book of the Bahamas, according to a writer in the *Journal of the Society of Arts*, give an idea of the extent of the sponge fishery business carried on in those waters. There are schooners and sloops with an aggregate tonnage of 5952 engaged in this industry. Attached to the vessels are 2517 open boats, and 5517 men and boys are employed on them. There are also 291 open boats engaged, manned by the owners living on the coasts of several of the out-islands to the number of 445. Disquieting reports as to the exhaustion of the sponge beds and the increasing quantities of small sponges brought to market, which should have been left in the beds to grow to a proper marketable size, recently led to the enactment of a law under which a sponge fisheries board is established with certain powers for the regulation

of the fisheries, and provided with a small annual grant for expenses. Recently the Bight of Abaco was examined, and the result fully confirms the suspicions previously entertained. It is reported that the beds are thickly sown with small sponges which are constantly being gathered by the itinerant fishermen who are continually working over these fields pulling all the sponge they can find without regard to size or quality, in consequence of which there are very few large sponges to be found anywhere. The spongers living in the settlements all round the coast are in sympathy with the movement for protecting the industry against the wasteful methods complained of, and will welcome any reasonable laws for the protection of the young sponge.

THE manurial experiments with cotton in the Leeward Islands detailed by Dr. F. Watts in the *West Indian Bulletin*, vol. vi., No. 3, may be expected to furnish useful information after a trial of some years, when a succession of crops will have emphasised the necessary requirements, and irregularities of climate can be eliminated by averaging results. Dr. Watts recommends the return of the seed to the land, preferably after crushing to express the oil, or as the manure from animals fed on the seed. From the notes by Sir Daniel Morris on grape fruits and shaddock it is gathered that the larger fruits, referred to *Citrus decumana*, are generally known as pumelows or shaddock; the smaller fruits assigned to the variety or species *paradisi* may be distinguished as forbidden fruit when round, or as grape fruit having a pyriform shape.

IN *Science*, June 23, 1905, Prof. B. M. Duggar reviews the present-day problems of plant physiology. On the subject of turgor regulation, allusion is made to the investigations of Mayerburg, which tend to show that increased turgor in fungi is caused by the production of osmotic substances within the cell. The writer refers to Moore's work on the organisms found in leguminous tubercles showing that they can assimilate free nitrogen apart from the leguminous plant, to Laurent's experiments on the effects of feeding dioecious plants with different fertilisers, with the results that nitrogen or calcium appeared to increase the number of staminate flowers, and potassium or phosphorus the number of pistillate flowers, and to Blakeslee's identification of homothallic and heterothallic forms of the Mucorineæ.

THE avenues and fruit gardens of Quetta afford a striking testimony to the beneficent results of the British occupation. Writing in the *Indian Forester* (October, 1905), Mr. E. P. Stebbing traces their origin to the foresight of the early administrators, notably General Sir Stanley Edwardes, Sir Hugh Barnes, and Colonel Gaisford. Cuttings of chinár, *Platanus orientalis*, poplars, and willows were brought from Kandahar in 1882. The avenues consist of a mixture of two or more species from the white and black poplars, the reamer, *Populus sp.*, and Euphrates poplars, the Kandahar, *Salix alba*, Kabul, *Salix aemophylla*, and weeping willows, the plane, and a species of American ash. In the gardens some fine old mulberries point to the existence of these trees previous to the occupation by the British; a few specimens of *Populus Euphratica* are found, and walnuts have been planted with satisfactory results.

WE have received a copy of a paper by Dr. Hans Reusch, of Christiania, on the geographical relations of Norway and Sweden. Dr. Reusch deals with the origin and geographical nature of the present frontier between the two

countries, and with the density and distribution of population. The paper is reprinted from the *Geographische Zeitschrift*.

PROF. DR. A. OPEL contributes to the *Deutsche geographische Blätter* a long paper on the forest regions of the middle and upper Mississippi, the prairie lands of Canada, and the New Ontario. The paper is a continuation of Prof. Opeł's previous studies in North America, and is an account of a lengthened journey undertaken during 1904; it contains an immense amount of valuable and interesting information.

THE *Mitteilungen* of the Vienna Geographical Society contain an interesting preliminary report on observations of the altitude of the forest-line in the Austrian Alps, by Prof. R. Marek. The most important general result is that the forest-line sinks continuously from west to east, the rate of fall increasing towards the east, and a difference of 556 metres being recorded within the area investigated—extending through about five degrees of longitude. The average height of the forest-line is about 750 metres below that of the snow-line.

THE third number of the *Abhandlungen* of the Vienna Geographical Society is devoted to a suggestive paper by Dr. Fritz von Kerner. The author discusses the annual march of temperature in the north temperate zone by considering the ratio between the difference between mean monthly values for April and October and the difference between the mean of the hottest and coldest months of the year. Plotting the values of this ratio on a chart, he gets lines to which the name "Thermoisodromes" is given. The distributions revealed in this way, and by further developments of the method, give results of considerable interest in tracing the relations of the "oceanic" and "continental" elements in the climate of the regions covered.

IN a neat art-green canvas cover, Messrs. Burroughs, Wellcome and Co. have issued their well known photographic exposure record and diary for 1906, and the moderate price of 1s. renders it within reach of every photographer. The important features of this pocket-book have been maintained, and the information brought up to date; the light tables, as was the case last year, are printed on perforated leaves, so that each month may be torn out, disclosing the table for the current month opposite the mechanical calculator fixed to the inside of the back cover. The excellent get-up, finish, useful contents, and general handiness of this exposure record and diary have made it a necessary part of a photographic outfit, and this year the photographer who possesses a copy can compete for prizes offered for pictures produced with "tabloid" photographic chemicals.

WITH the December (1905) issue the *Journal of the Franklin Institute* of Philadelphia concludes its 160th volume, and the varied contents show that the high standard that has characterised this journal for eighty years is well maintained. The more important papers in this number are of metallurgical interest. Prof. A. E. Outerbridge gives an able summary of recent scientific progress in metallurgy. Mr. E. Stütz gives a detailed account of the progress made within the past eighteen months in the introduction in the United States of the alumino-thermic process as applied in engineering practice. The progress has been rapid, and the process has proved quite as successful in America as elsewhere for welding and for the repair of castings. Lastly, Mr. Laurance

Addicks discusses the subject of the electrolytic refining of copper, especially from the point of view of the multiple system. The main differences between this system and the series system are in power cost, compactness, and cost of preparing anodes. The fact that large refineries on both systems are being satisfactorily worked bears witness to the close balancing of the advantages and disadvantages in each case, although much more material is refined by the multiple than by the series process.

DURING the night of January 5-6 the central and southern parts of England experienced a very severe gale; the 6h. p.m. observations received at the Meteorological Office on January 5 gave but little indication of the approach of such a severe disturbance, but were sufficient to justify the hoisting of storm signals on all our west coasts. The weather chart for 8h. a.m. on Saturday, January 6, showed that the centre of the storm, which had travelled very rapidly, lay over Lincolnshire, and that strong gales were prevailing in the English Channel and over the southern and eastern counties. In the London district the gusts were very heavy, but it did not experience the full fury which was met with on the coast, although some injury was caused by falling slates and chimneys, and some trees were uprooted. Several wrecks have been reported from the English Channel, and much damage was done to shipping in the Bristol Channel and elsewhere. On Tuesday afternoon (January 9) London and other parts were visited by sharp thunderstorms, accompanied by heavy rain and hail.

A SIXTH edition of the "Hints to Meteorological Observers," prepared under the direction of the council of the Royal Meteorological Society by Mr. W. Marriott, has just been published. The work has been revised and enlarged, and although only consisting of sixty-seven pages, including text, tables, and many illustrations, contains all that is necessary for ordinary normal climatological stations; its conciseness renders it, in our opinion, all the more valuable, and at the present time—the excellent instructions prepared by Mr. Scott for the Meteorological Office being out of print—it is the most useful book of instructions now available for English observers. Among the additions may be mentioned references to the Richard recording instruments (a want to which we recently referred), fuller instructions in connection with phenological observations, and tables for the conversion of anemometrical values from English to French measures, and *vice versa*. The work would be a desirable acquisition for all meteorological observers, especially those not conversant with the more comprehensive instructions lately published in the French and German languages.

THE Meteorological Committee has issued a useful little pamphlet (12 octavo pages, with charts) on the relation between pressure, temperature, and air circulation over the South Atlantic Ocean. The introductory remarks state that the preparation of monthly wind and other charts occupied the marine department of the Meteorological Office from 1898 to 1904, and were based on no less than 946,000 observations. The charts were published by the hydrographic department of the Admiralty, and at the request of the Meteorological Council Captain Hepworth, the marine superintendent, undertook the preparation of notes which, with a number of small diagrams, are deductions from an examination of the elaborate charts above referred to. They show the variations, the position and intensity of the areas of high pressure, and their relation to the equatorial doldrums, the distribution of gales,

fog, &c. The gales appear to reach the South Atlantic in two ways:—(1) they cross South America between 25° S. and Cape Horn, or (2) they avoid the land, and round Cape Horn to the eastward, following the general drift of air and sea surface. Fog is rarely met with north of the thirtieth parallel, except near the land on either side of the ocean. More southward fog may be expected, and is increasingly frequent the higher the latitude reached. This is attributed to the increase of gale frequency with latitude, the cyclonic systems causing rapid fluctuations in air temperature.

THE value for the latent heat of water is the subject of a note by Prof. A. Leduc in the current number of the *Comptes rendus* (January 2). He points out that, in spite of the fundamental importance of this constant, there is a difference of 1 per cent. between the 79.25 of Laprostaye and Deasins, confirmed by Regnault, and the 80.03 of Bunsen. He discusses the possible effect on these figures of the recent work on the variation of the specific heat of water, and shows that even after this is taken into account the difference is still of the same order. Substituting, however, 0.9176 for the density of ice at 0° C. for the 0.91674 found by Bunsen, the 80.03 of the latter investigator becomes 79.15. The larger number for the density of ice is that found by M. Leduc from his own researches, who thus arrives at 79.2 calories at 15° C. as the most probable value for the latent heat of water.

THE third part of "The Primary Arithmetic," edited by Dr. Wm. Briggs, has been published by Mr. W. B. Clive at 6d.

A COMPREHENSIVE catalogue of microscopes and accessories has just been issued by Messrs. W. Watson and Sons, High Holborn, W.C. Several of the instruments described and illustrated embody valuable modifications in constructional detail; and the requirements of all classes of workers are met by the two series of objectives—holoscopic and parachromatic—computed by Mr. A. E. Conrady, under whose supervision the whole of Messrs. Watson's optical work is now produced.

TWO more subject-lists of works in the library of the Patent Office have been published. The first comprises books on heat and heat-engines (excluding marine engineering), and the second deals with works on aerial navigation and meteorology. Each list consists of two parts, a general alphabet of subject-headings, with entries in chronological order of the works arranged under these headings, and a key, or a summary of these headings shown in class order. These lists may be obtained at the Patent Office, Chancery Lane, W.C., at 6d. each.

THE *Bulletin of the Johns Hopkins Hospital* for December, 1905 (xvi., No. 177), contains the second of the Herter lectures by Prof. Hans Meyer on the contributions of pharmacology to physiology, several medical and surgical papers and reports of societies, and some interesting extracts from medical reports by Dr. Wiesenthal, a physician who lived in Baltimore in the latter part of the eighteenth century. The *Bulletin* is an admirable publication, and should be in the hands of all medical practitioners.

THE Science Press of New York has published an account of a research of Prof. E. L. Thorndike on the measurement of twins as the first number of a series of monographs to be known as "Archives of Philosophy, Psychology, and Scientific Methods," which are to be edited by Profs. J. McKeen Cattell and F. J. E. Woodbridge. This monograph presents the results of precise

measurements of fifty pairs of twins from nine to fifteen years old in six mental traits, and their bearing upon the comparative importance of heredity and environment as causes of human differences in intellectual achievement.

FIVE new volumes—Nos. 146 to 150 inclusive—of Ostwald's "Klassiker der exakten Wissenschaften" have been received from the publisher—Mr. W. Engelmann, Leipzig. No. 146 is a paper by Lagrange (1768), translated from the French and edited by Herr E. Netto, the title being "Über die Lösung der unbestimmten Probleme zweiten Grades." J. B. Listing's "Beitrag zur physiologischen Optik," edited by Prof. O. Schwarz, forms No. 147 of the series; and a lecture delivered at Vienna by E. Hering in 1870, "Über das Gedächtnis als eine allgemeine Funktion der organisierten Materie," constitutes No. 148. Under the title "Tastsinn und Gemeingefühl," an article contributed by Dr. E. H. Weber in 1846 to R. Wagner's "Handwörterbuch der Physiologie" is reprinted with notes by Herr E. Hering. Of particular interest is the reprint (No. 150), edited by Herr A. von Oettingen, of Fraunhofer's paper entitled "Bestimmung des Brechungs- und Farbenzerstreuungs-Vermögens verschiedener Glasarten, in bezug auf die Vervollkommnung achromatischer Fernröhre." This volume contains a plate showing Fraunhofer lines in the solar spectrum, and a picture of the statue of Fraunhofer at Munich.

#### OUR ASTRONOMICAL COLUMN.

COMET 1905c (GIACOBINI).—Observing at Sunderland on December 22, 1905, Mr. Backhouse estimated that the magnitude of comet 1905c was approximately 8.3, at 18h. 40m. G.M.T., the observation being made in faint twilight; its diameter he found to be 5 $\frac{1}{2}$ '.

As this comet now rises but about an hour before sunrise, and the apparent distance from the sun is decreasing, it will be scarcely possible for further observations to be made before February, when the comet should again become visible, possibly to the naked eye, in the evening sky.

EPHEMERIS FOR HOLMES'S COMET (1892 III., 1899 II.).—The following search-ephemeris for Holmes's comet is published by Herr H. J. Zwiers in No. 4063 of the *Astronomische Nachrichten* :—

oh. G.M.T.	a (app.)	δ (app.)
1906	h. m. s.	
January 11	21 5 39	-18 59 53
" 13	21 9 45	-18 30 19
" 15	21 13 51	-18 0 25
" 17	21 17 57	-17 30 13
" 21	21 26 7	-16 28 55
" 25	21 34 15	-15 26 26
" 29	21 42 21	-14 22 49

In referring to the ephemeris for comet 1892 V. in these columns last week, that object was designated, by mistake, Holmes's comet. Both bodies were discovered at about the same time, and their periods are very similar, but comet 1892 V. is the faint one discovered by Prof. Barnard, by photography, on October 12, 1892, and was not seen on its return in 1899. A report that it has been detected at the La Plata Observatory is as yet not confirmed.

On the other hand, Holmes's comet was bright enough in 1892 to be observed with the naked eye, and, owing to its eccentric fluctuations in brightness, was described by Prof. Barnard as certainly the most remarkable comet he had ever seen, taking everything into consideration. During an interval of fourteen minutes its diameter, as observed with the 36-inch refractor, increased from 43 $\frac{1}{2}$ ' to 47 $\frac{1}{2}$ ', and the comet became perceptibly brighter whilst under observation. This comet was first seen on its return in 1899 by Prof. Perrine on June 10 of that year. According to the above ephemeris, the comet should set about ninety minutes after sunset on January 11, but probably its low declination will make it a difficult object to find.

NO. 1889, VOL. 73]

PHOTOGRAPHS OF THE SOLAR GRANULATIONS.—Using the astrographic telescope of the Pulkowa Observatory, Prof. Hansky has obtained some exceedingly interesting photographs of the solar granulations and spots on a large scale. The solar image at the focus of the instrument has a diameter of 3 cm., and by the use of an achromatic double concave lens was enlarged up to 54 cm. (about 21 inches).

The negatives thus obtained were photographically intensified by repeated copying, and details of the granulations became visible. Portions of the strengthened images were then enlarged to such a scale that the solar diameter would be equal to 6 metres (*i.e.* nearly 20 feet).

Copies of the sections thus enlarged are reproduced in the bulletin issued by Prof. Hansky, and on comparing two which were taken with an interval of twenty-five seconds it is seen that the granulations have undergone but little change, although relative movement and changes in brightness are discernible. Photographs taken with an interval of one minute show great changes, and after three minutes only one or two of the granules are recognisable.

The dimensions of the granules vary considerably; the smallest measured had a diameter of about 670 km., the largest about 2000 km.

Prof. Hansky intends to prosecute this research further, and hopes thereby to solve several questions regarding the periodic appearance of granules, the effects of their movements on spots and faculae, &c.

THE ORBIT OF ξ URSÆ MAJORIS.—On many grounds the determination of the correct orbit of the double star ξ Ursæ Majoris is of great interest and importance, and for this reason M. N. E. Nörlund, of Copenhagen, has made a very careful re-investigation of the available data and measurements. About eighteen orbits have been computed previously.

The results of this investigation are given in No. 4064 of the *Astronomische Nachrichten*, and the places computed from the elements obtained are compared with those obtained by many different observers.

For the period M. Nörlund obtains  $59.8096 \pm 0.06$  years, for the time of periastron 1815.957, for the distance  $a = 2''.5128$ , and for the eccentricity of the orbit  $e = 0.4108$ .

#### THE INTERNATIONAL FISHERY INVESTIGATIONS.

THE first of the reports referred to below is the first report of the British North Sea Investigations Committee on the International Fisheries Investigations. From time to time during the last three years in which the investigations have been in progress, the International Council has issued the "Bulletin des Resultats," in which are contained the results of the hydrographical and plankton investigations carried out on the periodic cruises; and also the series of "Publications de Circonstance," containing the results of incidental investigations carried out by the various naturalists on the staffs of the different committees. Quite recently, too, the council has issued the third volume of "Rapports et Procès-Verbaux," containing a *résumé* of the results obtained up to the present time. The present volume is, however, the first report which deals exclusively with the results obtained by the British vessels. It is a report to the Fishery Board for Scotland on part of the investigations made by the Scottish staff.

The first three papers in the report, written by Messrs. Helland-Hansen and Robertson, deal with the hydrography of the Færöe-Shetland channel and the adjacent sea regions—the area investigated by the Scottish vessels, H.M.S. *Jackal* and the *Goldseeker*. The principal Scottish line of hydrographical stations extends from the Shetlands to the Færöe Islands, and it is along this line that the changes taking place in the constitution of the sea-water can most easily be observed. It has long been known that the water in this region may be derived from various

"Report on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters, 1902-3." Edited by D'Arcy W. Thompson. Pp. vii+618. [Cd. 2612.] (London: H.M. Stationery Office, 1905.) Price 8s. 6d. net.

"Report on Fishery and Hydrographical Investigations in the North Sea and Adjacent Waters, 1902-3." Report No. 2 (Southern Area). Edited by Dr. E. J. Allen. Pp. ix+377. [Cd. 2670.] (London: H.M. Stationery Office, 1905.) Price 8s. 6d. net.